National Institute of Environmental Health Sciences

Seasonality of meningitis in Africa and climate forcing: Aerosols stand out

Author(s): Agier L, Deroubaix A, Martiny N, Yaka P, Djibo A, Broutin H
Year: 2013
Journal: Journal of The Royal Society, Interface / The Royal Society. 10 (79): 20120814

Abstract:

Bacterial meningitis is an ongoing threat for the population of the African Meningitis Belt, a region characterized by the highest incidence rates worldwide. The determinants of the disease dynamics are still poorly understood; nevertheless, it is often advocated that climate and mineral dust have a large impact. Over the last decade, several studies have investigated this relationship at a large scale. In this analysis, we scaled down to the district-level weekly scale (which is used for in-year response to emerging epidemics), and used wavelet and phase analysis methods to define and compare the time-varying periodicities of meningitis, climate and dust in Niger. We mostly focused on detecting time-lags between the signals that were consistent across districts. Results highlighted the special case of dust in comparison to wind, humidity or temperature: a strong similarity between districts is noticed in the evolution of the time-lags between the seasonal component of dust and meningitis. This result, together with the assumption of dust damaging the pharyngeal mucosa and easing bacterial invasion, reinforces our confidence in dust forcing on meningitis seasonality. Dust data should now be integrated in epidemiological and forecasting models to make them more realistic and usable in a public health perspective.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3565698

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Meteorological Factors, Temperature

Air Pollution: Dust, Interaction with Temperature, Particulate Matter

Geographic Feature:

resource focuses on specific type of geography

Desert

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Africa

African Region/Country: African Country

Other African Country: Niger

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Airborne Disease

Airborne Disease: Meningitis

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Methodology

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified